



NAVY DEPARTMENT

BUMED NEWS LETTER

a digest of timely information

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Scrub Typhus: Scrub typhus (or tsutsugamushi fever) is endemic in Sumatra, New Guinea, Java, Borneo, Formosa, Japan, Australia and the Federated Malay States. The disease has been contracted by military personnel serving in some of these areas.

As the name implies, scrub typhus is a disease that is closely related to a particular type of vegetation: the infected places are circumscribed areas of untilled open country, especially land that has been cleared of jungle and then has been allowed to become overgrown with weeds and scrub. Cases are confined strictly and exclusively to persons who work in or pass through the jungle grass ("lalang"), bush and uncultivated areas.

Vegetation of this type is common in the regions mentioned above. Such land and vegetation furnish all the elements necessary for the maintenance of the etiological agent, Rickettsia orientalis. The reservoir of this obligate intra-endothelial-cell pathogen is believed to be field mice and possibly rats. This microorganism is transmitted to man only by the bite of an infected mite: the larval form of Trombicula akamushi or T. deliensis. The larval mite does

not convey the Rickettsia directly from the rodent reservoir to man; after it has had a single blood-meal on the rodent and has become infected, it drops to the ground. There it matures to become a nymph and finally an eight-legged sexually-mature adult which resembles very closely the harvest mite or "chigger" of the United States. In the adult stage it remains on the ground living on decaying vegetable matter. The adult female lays eggs and the six-legged larvae hatched from these contain the "inherited" Rickettsia. These larvae, requiring a blood-meal for their development, climb on leaves, flowers and blades of grass and await a passing rodent or person. This explains why the disease is not contagious and why it never occurs in true epidemics.

The usual sequence of events following the bite of an infected "akamushi" is that a small pustule forms at the site, within 3 to 6 days the lymph nodes that drain the area enlarge and become tender, and 8 to 11 days after the bite there is a sudden onset of fever, headache and general malaise. About 5 days later a maculo-papular rash develops on the chest and spreads to the extremities. Other symptoms and signs may be present at this time - there may be auditory hyperacuity, conjunctival congestion, bronchitis, symptoms referable to the gastro-intestinal tract (nausea, vomiting and constipation), and an enlarged spleen. The fever terminates by lysis in about 14 days. Complete recovery is delayed. Tachycardia and palpitation, evidences of the actual myocardial damage characteristic of the disease, may persist for many months after recovery. Therefore, a long period of convalescence may be required before patients are fit for duty. The mortality is less than 10 per cent. Properly fixed (Zenker's), cut (thin), and stained (Giemsa) tissue sections from fatal cases show R. orientalis in the cytoplasm of endothelial cells and monocytes. The myocardium shows a characteristic diffuse interstitial myocarditis.

Because the primary lesion is often hard to find and differentiate from cuts, scratches and bruises and because the rash is often evanescent and may be missed, a final positive diagnosis of scrub typhus must be made on the result of the Weil-Felix reaction. Sera from patients having scrub typhus agglutinate suspensions of Proteus vulgaris, strain OXK. A single determination is almost valueless. In order to establish the diagnosis on this basis several samples of blood should be taken at regular intervals. These should show a clear-cut and definite increase in titer during the course of the disease, and a decrease in the late convalescent period.

The immunity conferred by scrub typhus is not lasting. Reinfection is not uncommon even in the clinically more severe form of the disease that occurs in Japan. The failure of the natural infection to produce resistance against second and even third infections indicates that vaccine prophylaxis would probably be unsuccessful.

Endemic - i.e., rat-flea-borne typhus is differentiated serologically from scrub typhus by the Weil-Felix reaction. Sera from patients with the former disease agglutinate suspensions of Proteus vulgaris, strain OX19.

Preventive measures should be directed toward avoiding mites. Under service conditions this is admittedly difficult. Every effort, however, should be made to have the personnel in infected areas keep their collars buttoned, sleeves down and buttoned, and trousers secured at the ankles over the shoes. Dimethyl phthalate is an effective mite repellent and should be used as directed on the bottle - "Apply 1/2 inch barrier to all openings of uniform by drawing the mouth of the bottle along the cloth. Apply to inside of collar, fly and cuffs of trousers and on socks above shoes. Leggings should be treated along all edges." (D.R.M.; W.Mc.L.; D.S.F.)

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Removal of Cysts of Amoebae from Water: Considerable research is being carried on attempting to improve the methods of purification of water in the field. In Volume 2, Number 7 of the Bumed News Letter, a brief description of the hyperchlorination-dechlorination method for use in Lyster bag sterilization was presented.

In relation to the use of portable water purification units, the following is quoted from the "Bulletin, U.S. Army Medical Department", No. 71, December, 1943:

"When water that has not previously been coagulated" (i.e., aluminum hydroxide flocculation) and allowed to settle is filtered through standard filters at a high rate, cysts of *Endamoeba histolytica* will pass through the filter. Experiments carried out at Fort Belvoir, Virginia, by the Engineer Water Board, in cooperation with the Medical Department and the National Institute of Health, indicate that water likely to contain cysts should be (1) treated with a heavy dose of aluminum sulphate or other coagulating agent, preferably at the rate of 6 to 10 grains per gallon, (2) allowed to settle for at least one hour; (3) filtered at a rate not to exceed 6 gallons per square foot of filter surface per minute; and (4) chlorinated to provide a residual of at least 1 p.p.m. The suction line to the filter should draw water from the settling basin at a depth of six inches to 12 inches below the surface. In field water supply, three canvas or other storage tanks are normally required for treatment of water suspected of containing cysts; two should be used alternately for storage, treatment, and settling of the raw water, and one for treated water."

The use of diatomaceous earth filters is being studied at present. So far the results have been rather encouraging with reference to the removal of cercariae and of the cysts of amoebae. As soon as these studies are completed, the results will be published. (V.C.T.)

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Reactions to Parenteral Fluid Administration: Strumia, McGraw and Blake have recently published a comprehensive review of this subject. The following represents an abstract of their paper.

Pyrogenic reactions are by far the most common and may occur after the intravenous administration of any fluid which has been improperly prepared or administered with improperly prepared apparatus. Pyrogens, strictly speaking, are any substances which will provoke a febrile reaction after intravenous administration. Pyrogens are usually the product of bacterial growth and disintegration of bacterial bodies. Poorly prepared or preserved distilled water, water from contaminated glassware and practically all tap water contain pyrogens. They cannot be removed or rendered harmless by sterilization by heat, and they will pass through sterilizing filters.

The only effective means of removing pyrogens from water is proper distillation. If distilled water contains pyrogens, their presence is usually due to one of three causes: first, the still or the container used to collect the distillate is contaminated; second, faulty construction of the still allows droplets of water carrying pyrogens with them to be carried over with the current of steam; and third, perfectly distilled water may be allowed to stand under conditions that permit contamination by bacteria. It is desirable to start with as good a water as possible and to operate the still at a rate about half that of the rated capacity. No distilled water should be used after 3 to 4 hours unless it has been sterilized in a sealed container.

As human blood, plasma and serum are relatively good media for bacterial growth, every precaution should be taken to prevent their contamination by bacteria. These precautions include asepsis in the collection of blood, and the preparation of plasma and serum by the closed method. Refrigeration will retard but not stop bacterial growth.

Aside from the pyrogens contained in the fluid itself, there is another and perhaps even more common source of pyrogenic reactions. This is the glassware and rubber tubing used to prepare and administer the material. Dirt and dust, the excess of sulphur on new compound rubber tubing and allowing the apparatus to stand wet for many hours are important factors. The remedies are: (1) Avoidance of contamination of the fluids remaining unused after administration; (2) proper cleaning of glassware and other apparatus followed by rapid drying or sterilization; and (3) not storing distilled water over three hours after preparation unless sterilized.

In patients with fever, especially if of the septic type, the intravenous administration of fluids, especially whole blood, often causes a temperature rise. It is desirable in these cases, whenever possible, to administer intravenous fluids at a time when the temperature is at its expected low, usually in the morning.

Embolic reactions: Whole blood should always be filtered immediately before administration. This is particularly important for blood preserved at refrigerator temperature for a period of time because of the rapid and progressive formation of numerous fine, soft flocculi. Plasma and serum should always be filtered at the time of preparation, preferably at the time of pooling. Flocculation of plasma may be entirely avoided by preserving plasma either in a frozen or dry state. Effective filtration of flocculi, particularly thread-like precipitates of fibrinogen, is easily accomplished by the use of four layers of 40-mesh gauze or equivalent material. The use of standard 200-mesh stainless steel gauze is equally satisfactory.

Allergic reactions are usually attributed to substances of alimentary origin, to which the recipient is sensitive, contained in the whole blood, plasma, or serum. They consist of localized urticaria or, less frequently, generalized urticaria with a rise of temperature and other angioneurotic symptoms. One way to reduce allergic reactions is to insist that blood be obtained from the donor when he is in a fasting condition.

Hepatitis has been known to occur following administration of yellow fever vaccines containing human serum, human convalescent serum, and human whole blood and plasma. It is probable that the hepatotoxic properties of the blood and blood derivatives were due to a recent infection of the donor. All prospective blood donors should be carefully questioned concerning a history of previous jaundice or contact with jaundice cases.

Hemolytic crises may occur in a patient with hemolytic anemia after the administration of well-matched whole blood. In these cases care should be taken to avoid such reactions by testing their "sensitivity" with a token transfusion of 100 c.c. of blood, comparing the serum bilirubin before and five hours after the test dose.

Liver disease, particularly if accompanied by jaundice and hypoproteinemia, represents a situation in which transfusion reactions are more common. Here again a token transfusion may be tried.

Heated blood or plasma: The administration of even large quantities of cool fluids intravenously does not cause reactions. In view of the fact that severe reactions may follow administration of excessively heated whole blood, plasma or serum, it is desirable to eliminate entirely the practice of warming transfusion fluids prior to administration. (See Bumed News Letter, December 10, 1943, page 24, "Destruction of Red Blood Cells in Burns.")

Hemolytic reactions are comparatively rare but, because they are often fatal, it is important to take every precaution to avoid them. By far the great majority follow transfusion of whole blood into recipients whose plasma agglutinates the donor's cells.

Essential preventive measures are careful blood grouping of the recipient and the donor, careful crossmatching tests and adequate studies regarding the anti-Rh and other less common isoagglutinins particularly in pregnant or puerperal women and in persons receiving repeated transfusion. The preparation for a blood transfusion must be done by a well-trained person. The sera used for grouping must be of high potency, and should be checked at regular intervals against cells of known groups. The anti-A serum must be capable of agglutinating the subgroups of A and AB. Crossmatching should be done at room temperature and by incubating at 37° C for a half hour as an aid in detecting agglutinins against such antigens as the Rh factor. Serum used for test-tube crossmatching should be inactivated to avoid hemolysis which might otherwise give the appearance of a negative reaction. All tests should be checked microscopically as well as macroscopically. All Rh-negative pregnant or recently pregnant women should preferably receive Rh-negative blood of proper group since the anti-Rh agglutinins may not be detectable in all instances even though the crossmatching is done at 37° C and followed by centrifugation and examination.

From all the experimental work done to date, it seems justifiable to go on the assumption that serum, plasma or group "O" blood with an unusually high isoagglutinin titer may cause hemolysis of the susceptible recipient's cells in some instances. These reactions are very rare and can certainly be readily avoided by pooling the blood or blood derivative.

An hemolytic reaction usually starts during or shortly after the transfusion. A chill usually occurs often followed by fever, nausea, vomiting, pain in the lumbar region and a sense of constriction in the chest. There may be pain over the bladder and an urge to defecate. Transient hemoglobinemia with the passage of scanty reddish-brown urine is followed within five hours by hyperbilirubinemia, and shortly after by jaundice which usually reaches its peak within 24 hours. The urine contains albumin, hematin casts, hemoglobin and erythrocytes. The oliguria may improve and the patient rapidly recover, but more often azotemia follows. This may lead to uremia and death or, after a period of several days when the issue is in doubt, the flow of urine may increase and recovery follow. The amount of blood administered seems to bear some relation to the end result: an argument for slowly and cautiously given transfusions where hemolytic reactions are feared.

With respect to treatment it seems logical to maintain an adequate fluid intake and an adequate blood volume. The authors believe that no treatment has proved uniformly successful. Alkalinization, renal decapsulation or sympathectomy, pelvic lavage, blood and plasma transfusion and many other procedures have been advocated.

Nitritoid reactions are characterized by a sense of constriction of the chest, often very alarming, pain over the lumbar region, sometimes, but not always,

followed by chill and rise of temperature and occasionally by nausea, vomiting and headache. The reaction is usually over after four to five hours and appears to cause no permanent damage. Such reactions have been observed after administration of whole blood but are more common after administration of freshly prepared serum or fresh serum which has been kept in the frozen state or dried from the frozen state. It is possible that one of the substances causing nitritoid reactions may be thrombin, which is formed in excess during the process of clotting.

Speed of administration is an important element in safety. If the concentration is isotonic, a rate up to 20 c.c. per minute is ordinarily perfectly safe and well tolerated. However, this rate may be altered, either up or down, depending upon the need of more rapid blood volume replacement or the patient's cardiac condition. Thus in patients in severe shock it is necessary to administer intravenous fluids, particularly plasma or blood, at a rate much faster than that just mentioned. As much as 500 c.c. of material can be administered in a period of 10 minutes. Beyond this quantity, it is advisable to reduce the rate of administration. On the other hand, in a patient in whom cardiac weakness is suspected, rates of fluid administrations not exceeding 10 c.c. per minute should be advised. This is particularly true for the administration of whole blood because of its higher viscosity. With increased speed the concentration of pyrogens may at any time rise sufficiently to cause severe reactions. The quantitative relationship between the severity of hemolytic reactions and the amount of whole blood administered makes slow injection desirable when such reactions may be anticipated. When not dealing with an emergency, therefore, the fluids should be administered at the slowest rate compatible with good results, not over 20 c.c. a minute. (Ann. Int. Med., Nov. '43.)

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Perhaps some of the points raised by Dr. Strumia in the section of his paper which deals with speed of administration are deserving of further emphasis. In the medicine of the present war intravenous administration of blood and its derivatives, water, electrolytes, food and drugs has assumed an important place with respect to other methods of therapy. Plasma and serum albumin by virtue of their ability to increase the osmotic pressure of the blood tend very rapidly and effectively to increase blood volume. While restoration of blood volume to normal is almost always desirable in conditions where it has been pathologically reduced, it is possible as a result of therapeutic enthusiasm to raise the blood volume to a degree which may be dangerous.

The dangers of overloading the circulation are most serious in the presence of heart disease. In spite of the care taken to exclude candidates for enlistment with cardiac abnormalities, heart disease is occasionally encountered among

naval personnel. It must be remembered that sclerosis of the coronary arteries with limitation of coronary flow and diminished cardiac reserve may be present in men well under the age of 40. Also, because of the need for trained personnel in times of war, men who would ordinarily be retired or who have been retired are being respectively retained in or recalled to active duty status. Acute rheumatic myocarditis occurs with considerable frequency. The Rickettsial diseases are known to be associated with a myocarditis. Also, it has been shown that associated with prolonged anemia the functional capacity of the heart may be seriously impaired and there may be a considerable dilatation of its chambers.

It need hardly be pointed out that a rapid increase in blood volume is one of the most effective mechanisms for precipitating cardiac failure in the presence of any myocardial weakness. In patients where the presence of diminished cardiac reserve is suspected or known to be present and the use of intravenously administered fluid is desirable, the introduction into the apparatus of a venous pressure machine is a helpful precautionary measure. Fluids, other than small amounts serving as vehicles for drugs, should not be introduced into a vein in the presence of an elevated venous pressure or in the presence of a venous pressure which rises to an abnormal level during the course of the fluid administration. In this connection it should be pointed out that in patients with heart disease, even in the presence of cardiac failure, fluids can be given safely by mouth or by duodenal tube in large amounts as long as they do not contain any sodium salts.

Three other conditions should be mentioned in which overloading the circulation with intravenous fluid is known to be hazardous: (1) Injuries of the chest where the normal balance of the cardiorespiratory relationships is disturbed, (2) pulmonary edema due to irritant gases, and (3) anuria due to obstruction of the renal tubules, such as may occur following hemolytic transfusion reactions. In all of these conditions a normal blood volume should be maintained.

Additional References: Drummond, Brit. M.J., Sept. 11, '43.
Whitby, L.E.H., Lancet, May 9, '42.

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Requests to BuMed for Information: It is suggested that medical officers communicate to the Bureau any problems they perceive or encounter. The Bureau has access to extensive and authoritative sources of information. There are now available five naval laboratories of medical research as well as the comprehensive resources of the National Research Council and other government agencies. Communications will be answered in accordance with the opinions of the best sources of information available.

* * * * *

Versatility of The Hemolytic Streptococcus: Of all the organisms pathogenic for man probably none produces a greater variety of disease manifestations than the Streptococcus hemolyticus. The versatility of this streptococcus can be attributed to its extraordinary capacity to synthesize a number of substances which react with human tissues. Some of these substances and their effects have been identified. Erythrogenic toxin, when elaborated in high concentration, produces a scarlatinal rash in susceptible (Dick-positive) individuals. Two streptolysins (one oxygen labile and the other oxygen stable) lyse human erythrocytes. Fibrinolysin dissolves human fibrin. These and other soluble products of the bacterial cell make possible the invasion of tissues. The effects of the cellular constituents are at present more obscure. It has been shown, however, that streptococcal nucleoprotein is a sensitizing agent. Other proteins make possible serological typing, and the presence of a carbohydrate permits serological grouping.

The development of streptococcal manifestations depends on at least three factors: the capacity of the organism to produce substances which react with human tissues, the reactivity of the host to these substances and the environment. All three of these factors are constantly changing variables. The influence of environment is modified by season and geographical location. The reactivity of the host is influenced by age and previous experiences with the hemolytic streptococcus. The capacity of the microorganism to produce tissue-reactive substances fluctuates with passage from host to host. The accumulated effect of these variables is the protean clinical picture of streptococcal disease. This can best be appreciated by following the activities of a single strain of hemolytic streptococcus in a closed colony. For this purpose an hypothetical epidemic will be described. This hypothetical streptococcal outbreak is described as it might have occurred at a boys' school.

Our imaginary boys' school matriculated 226 boarding and 35 day students between the ages of 12 and 17. During the Christmas holidays one of the boarders contracted scarlet fever at his home. His illness was mild, and he returned to school 24 days after the onset of infection. On resuming his school activities, he found that he had a cough and felt tired during physical exercise. On January 25, ten days after this boy returned to school, another student developed a severe attack of acute tonsillitis. This was followed by a series of infections occurring through February and March to April 6. All of these diseases, including the original source of infection were identified as due to hemolytic streptococcus Group A, type 13.

This outbreak began insidiously with throat infections, two to five a week. In the third week of February, however, the seriousness of the epidemic became apparent when 22 boys were admitted to the school infirmary, and the weekly incidence of streptococcal diseases continued to be high until the latter part of March when the epidemic subsided. The final case of tonsillitis occurred on April 6 when the epidemic ended spontaneously. The striking observation during

this epidemic was that, of the 90 type 13 respiratory infections, all but two occurred among the pupils who boarded. Two day pupils contracted pharyngitis and three members of the family of one of the teachers became ill. This family had entertained many of the students including the boy believed to be the original focus. The teacher's small son contracted bronchitis. A few weeks later his wife developed sinusitis which was followed by puerperal sepsis two days post-partum, and his elderly mother developed erysipelas.

There were a number of complications in March. Several of these required operative interference, two laparotomies, one thoracotomy and one mastoidectomy. There was one death in an older boy who developed bacteremia following pharyngitis and who at autopsy was found to have an acute bacterial endocarditis on a healed rheumatic mitral stenosis. There were also four complications in April. Two boys, about three weeks after recovery from mild pharyngitis, developed rheumatic fever. One boy, following cervical adenitis, had acute hemorrhagic nephritis, and another boy, seven days after acute tonsillitis, manifested erythema nodosum. Altogether there were twenty-three different diseases associated with this outbreak of hemolytic streptococcus type 13 infection. They are tabulated as follows:

Primary Infections		Septic Complications		Sensitization Sequelae	
Diagnosis	Number of Cases	Diagnosis	Number of Cases	Diagnosis	Number of Cases
Tonsillitis	22	Pneumonia	4	Rheumatic fever	2
Pharyngitis	21	Cervical lymphadenitis	4	Acute nephritis	1
Catarrhal fever	18	Otitis media	3	Erythema nodosum	1
Scarlet fever	8	Pansinusitis	2		
Bronchitis	6	Peritonitis	1		
Tracheobronchitis	5	Mesentery lymphadenitis	1		
Rhinitis	4	Empyema	1		
Tracheitis	3	Mastoiditis	1		
Laryngitis	2	Puerperal sepsis	1		
Erysipelas	1	Endocarditis	1		
Total	90		19		4

In summary, one strain of hemolytic streptococcus serologically identified as type 13 initiated an outbreak of 90 infections complicated by 19 suppurative diseases and 4 sterile inflammatory processes. Such an epidemic calls attention to many of the disease manifestations of *Streptococcus hemolyticus*. Epidemics similar to this hypothetical outbreak have occurred frequently at Naval Training activities and demonstrated the versatility of hemolytic streptococcus as a human pathogen. (A.F.C.)

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Effect of Bright Sunlight on Dark Adaptation: A recent report from the British Admiralty Research Laboratory indicates that there is no significant impairment of ultimate dark adaptation following prolonged exposures to sunlight. After 45 minutes in the dark, the threshold levels reached by subjects at a Mediterranean station and in Egypt were as good as those reached by subjects in the United Kingdom. This report suggests that the commonly held opinion that exposure to tropical sunshine impairs night vision may be due to the short period of twilight in the tropics combined with the somewhat longer time (up to 45 minutes) required for full dark adaptation after exposure to bright sunshine. These findings indicate that under normal conditions of bright sun, loss of night vision is not to be expected. It is not suggested, however, that extreme conditions of tropical sun or snow glare cannot impair night as well as day vision, or that protective glasses are unnecessary under such conditions. (R.B.B.)

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Causalgia: DeTakats calls attention to the fact that causalgia, although extremely rare in peacetime, complicates wartime injuries with sufficient frequency to deserve mention.

In the typical case three stages of the syndrome are present:

1. Severe, persistent burning pain with paroxysmal exacerbations due to jarring, air currents or emotional upsets. The extremity is warm and dry. The subcutaneous and periarticular spaces are edematous, and the muscles are spastic in their effort to splint the painful joint. Oscillometric studies indicate increased blood flow. The painful area is closely limited to the site of the injury.
2. The periarticular edema has spread for some distance; the part may become hard, cyanotic and cold to the touch. The joints are stiff, and the muscles are becoming atrophic. Spotty atrophy of the bone can be demonstrated by X-ray. The blood flow is less active, but still greater than in the non-affected limb.
3. The atrophy progresses, involving the skin, muscles and bone, with ankylosis. The pain is intractable and may spread in the limbs proximally even to the trunk.

Causalgia most often follows a mild injury of a peripheral nerve. The mechanism of the vasodilation that is an essential part of this syndrome is not clearly understood. The possibility that cholinergic nerves are involved is suggested by the fact that the pain is aggravated by injections of prostigmine. The possibility that the vasodilation takes place in the capillaries rather than

in the arterioles is suggested by the fact that improvement follows sympathectomy, a procedure that would normally be expected to increase the blood flow to the region involved. Cooling the limb or arterial compression brings about a decrease in pain through a reduction in blood flow.

Treatment in the early mild form consists of immobilization and daily injections of 1 per cent procaine hydrochloride into the injured area. When the neuralgia has spread beyond the site of injury, and this may take from ten to thirty days, paravertebral injections of procaine should be given and repeated as the relief of pain wears off. When sympathetic block promptly abolishes the symptoms but they recur with undiminished intensity after a few hours or days, sympathetic ganglionectomy should be undertaken. With regard to the upper extremity, injection of the second and third thoracic ganglia gives better results than injection of the stellate ganglia. For the lower extremity, removal or infiltration of the second and third lumbar ganglia is sufficient. The importance of early treatment cannot be overemphasized. Those patients who reach the third stage present a problem in orthopedic and psychiatric care that is almost insoluble and in which the risk of drug addiction or suicide is great. (Arch. Neurol. & Psychiat., Sept. '43.)

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Pyrethrum No Longer Available for Roach Control: Because of the shortage of pyrethrum, it has been found necessary to allocate the whole available supply to the control of mosquito-borne diseases. Completely satisfactory substitutes for pyrethrum in the eradication of cockroaches have not been found, but the following preparations should be of material aid:

(a) An insecticide spray of 10 per cent lethane in water-white kerosene. This insecticide should be used in the same manner as the former Navy insecticide.

(b) Exterminator, Roach (Navy Specification 51E2) available in a powder form and as tablets. This is essentially boric acid, which is a slow stomach poison for roaches. This preparation may be safely used in liberal amounts in areas frequented by roaches.

Roaches will not eat boric acid unmixed with food substances. The following substitute preparations may be used should the Roach Exterminator mentioned above not be available:

(1) A powder made by mixing equal parts of lactose and boric acid.

(2) Pellets made of the thick paste resulting from adding a sufficient quantity of boric acid to evaporated milk.

(3) Sodium fluoride. This substance, though extremely toxic to mammals, may be used under strict supervision. All packages of this toxic agent should

be labelled in a distinctive manner, "poisonous." The preparation itself should be colored preferably Nile blue, to avoid its being mistaken for harmless preparations. Under no circumstances should containers of it be left in galleys or messes. (V.C.T.)

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1942 Death Rate the Lowest on Record: A report recently released by the Bureau of the Census, Department of Commerce, reveals that the death rate in the United States for 1942 was 10.4 per thousand of population. This is the lowest death rate ever recorded for our country (the 1941 rate being 10.5 per thousand). The 10 leading causes of death and their rates per 100,000 follow:

	<u>1942</u>	<u>1941</u>
1. Diseases of the heart	295.2	290.2
2. Cancer and other malignant tumors	122.1	120.2
3. Intracranial lesions of vascular origin	90.2	89.1
4. Nephritis	72.4	75.1
5. Pneumonia and influenza	55.7	63.9
6. Tuberculosis	43.1	44.5
7. Premature Birth	25.8	25.1
8. Diabetes mellitus	25.4	25.5
9. Motor vehicle accidents	21.2	30.0
10. Syphilis	12.2	13.3

(D.F.S.)

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Otomycotic Infections: Mycotic infections of the ear canal are quite common in the tropics. They may be extremely painful and cause considerable loss in working time. Concerning this problem as it is encountered in the South Pacific, Lt. Comdr. F.E. Garfield (MC) USNR writes:

The condition has often been prolonged and troublesome. It is obvious that laboratory and statistical studies are difficult to obtain.

The usual forms of treatment as used in the United States have not been satisfactory in the South Pacific. Salicylic acid or Bichloride of Mercury in Alcohol, Cresatin, Thymol in Alcohol, and Tincture of Merthiolate have not been effective and in addition have caused swelling, pain and dermatitis. Dyes and sulfonamides in powder or crystal form have failed to be effective.

The treatment outlined below has given prompt and uniformly good results in approximately 95 per cent of the cases over a period of eight months.

Recommended treatment wherein the chief findings are discharge of pus or where there is an accumulation of the matted, wet-wallpaper type of exudate is as follows:

1. Daily cleansing of the external canal and tympanic membrane either dry or with Boric Alcohol solution on cotton-tipped applicators. The solution contains:

Boric Acid 1.2 Gm.
Alcohol 50 per cent 30.0 c.c.

2. Following the above, cotton wicks saturated in 10 per cent solution of sulfadiazine sodium are inserted into the canal and left in place for 24 hours. The canal must be thoroughly dried and cleansed of discharge before fresh wicks are inserted.

3. After the discharge has ceased the ear is insufflated by means of a blower with the following powder every three or four days until the canal looks healthy and is free from moisture:

Boric acid powder	10 per cent
Sulfadiazine powder	10 per cent
Tannic acid powder	5 per cent
Talcum	q.s.

The powder should be used as a dust. Difficulties can arise if too much powder is blown into the external canal, as it has a tendency to form hard lumps which can interfere with treatment.

In acute external fungoid otitis characterized by a good deal of edema and pain the recommended treatment is as follows:

1. The canal is cleaned of all discharge with dry cotton-tipped applicators.
2. Cotton wicks saturated with equal parts of 95 per cent alcohol in glycerine are inserted in the canal, deeply, past the edema, and left in place for 24 hours. This is repeated after cleansing every day until the swelling and discharge have diminished and the pain has disappeared.
3. Codeine and aspirin orally and hot moist external compresses at times are necessary to relieve the auricular pain.
4. When the edema has disappeared the therapy as outlined above for otomycosis is followed until a cure is effected.

Prophylactically the following simple rules should be observed:

1. Water is contraindicated in the ears in this area whether or not an individual has a fungus infection.

2. Ears once subjected to mycotic infections should not be irrigated during the course of the disease or following an attack.

3. Divers and swimmers should have their ears thoroughly dried following immersion.

4. Bathers should take precaution to prevent water from seeping into the canals.

5. The daily toilet should omit washing of the ears except for a mechanical removal of debris from the external ear by a moist washcloth.

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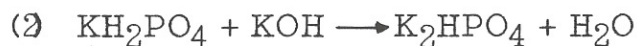
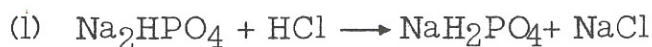
Phosphates in the Therapy of Chemical Burns: Poser and Haas recommend the use of a phosphate buffer for the treatment of burns caused by acid or basic substances. Its use is suggested by the following considerations: The customary therapy of chemical burns has definite disadvantages, particularly when such sensitive tissues as the cornea are involved. In order to achieve rapid and penetrating neutralization of acids and bases, high concentrations of the antidote are required. This prerequisite for successful therapy is not fulfilled by the commonly used reagents, since they can be applied only in dilute solutions because of their unphysiologic nature.

As a further requirement for effective treatment it is essential to maintain the hydrogen ion concentration of the antidote at a physiologic level. The following examples illustrate that the aforementioned requirements are not at all satisfied by the therapeutic agents in general use: A 5 per cent solution of acetic acid, recommended in textbooks for the treatment of burns caused by strong alkali, has a pH of about 2, whereas a 5 per cent solution of sodium bicarbonate, used heretofore for neutralizing acid burns, has a pH of 9. As the physiologic pH is approximately 7, it becomes evident that in the first case the hydrogen ion concentration is a hundred thousand times too high while in the second case it is a hundred times too low. Such deviations from biologically compatible limits are bound to result in harmful effects, especially in the treatment of delicate tissues as those of the eye.

In the past, chemical burns due to acids or bases required different antidotes. Therefore a knowledge of the chemistry of the toxic agent and a history supplied by the patient were indispensable. Since the immediate neutralization of the injurious chemical is the most important feature of the treatment, designed to reduce penetration of the tissues to a minimum, valuable time may have been lost in gathering the information mentioned. Future surgical or medical care may never restore what could have been saved by adequate, immediate treatment.

The phosphate buffer recommended here for the neutralization of chemical burns is prepared by dissolving 70 Gm. of monobasic potassium phosphate,

KH_2PO_4 , and 180 Gm. of dibasic sodium phosphate, $\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$ in 850 c.c. of water. The concentration of the solution thus obtained is molar with respect to phosphate, but as the phosphates are physiologically occurring substances, they can be safely employed in such high concentrations. Thereby, prompt neutralization of the offending chemical is insured without introducing new complications, at the same time limiting the degree of burn and the corresponding amount of scarring that usually results. The phosphate solution is neutral, pH 7.0, and, owing to its buffering action, the hydrogen ion concentration will always remain within the physiologic range. The fact that it can be used equally well for the neutralization of either acids or bases is demonstrated by the following examples:



Application of the concentrated phosphate buffer to a normal eye merely results in some hyperemia of the conjunctival tissue, which will disappear on the following day. Using a more dilute solution of the buffer would eliminate even this slight discomfort but would at the same time diminish the effectiveness of the antidote. (J.A.M.A., Nov. 6, '43.)

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Vincent's Fusospirochetosis: Jewesbury reported the development of typical Vincent's infection of the gums and buccal mucous membranes of two patients who were under treatment for syphilis. One patient had received 5.0 Gm. of intravenous arsenical (N.A.B.); the other had received one course of 5.55 Gm. two months previously and had had 4.65 Gm. on his second series when the Vincent's infection started. (Brit. M. J., Sept. 18, '43.)

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Farley described six patients who, following treatment with arsenicals, developed granulocytopenia which was complicated by stomatitis of the Vincent's type. He found reports in the literature of 39 similar cases. (Am. J. M. Sci., Feb. '43.)

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Such evidence would make it appear futile to give intravenous arsenicals for the treatment of Vincent's infections of the mouth and gums.

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There are conflicting reports regarding the efficacy of the arsenicals in infections of the mouth due to Vincent's organism. While the Vincent's infection may occur as secondary to serious or even fatal disease, it in itself is never a primary cause of death. Intravenous administration of arsenicals is associated with a definite mortality rate. Their use should be restricted to those conditions in which the seriousness of the disease justifies the use of drugs which occasionally cause fatal accidents.

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Vincent's organism is a common inhabitant of the normal mouth. Under certain conditions it becomes pathogenic and acts as a secondary invader. The primary conditions leading to such secondary infection are many, but in general fall into three main groups:

(1) Poor surgical condition of the gums resulting principally from pyorrhea or gingivitis. "Pockets" with poor drainage may tend to harbor the Vincent organism with the development of a chronic infection.

Treatment in this group is mainly a dental problem and involves attention to oral hygiene and efforts to clear up the underlying pyorrhea or gingivitis. Any one of the many chemical agents found to be effective against the spirochetes and fusiform bacilli may be helpful. Among these are sodium perborate, zinc peroxide, hydrogen peroxide and 10 per cent chromic acid.

Prolonged use of sodium perborate should be avoided because black hairy tongue has been produced when this substance has been used without proper supervision over a long-continued period of time. Application of chromic acid in 10 per cent concentrations, or acids in general, to the gingivae should be limited to a short period because of possible damage to tooth structure.

(2) Medical conditions which result in lowered resistance of the mucous membranes of the mouth to infection: (a) Situations in which there is granulocytopenia, for example, overwhelming infections, sensitivity to drugs such as antipyrine, acetanilid, sulfonamides, arsenicals, infectious mononucleosis. (b) Deficiency states, particularly those associated with deficiency in the vitamin B complex. Among the members of the complex nicotinic acid is important. (c) Any condition which may lower the general resistance of the individual to infection.

Here again the treatment of the primary condition, if possible, is all important and the simple methods of treatment mentioned above will usually suffice. Hot irrigations are particularly useful, as they tend to improve the local resistance of the tissues of the mouth, to keep the mouth clean and to aid in the separation of slough. Nicotinic acid and ascorbic acid could not be

expected to be helpful except in the presence of a deficiency of one or the other vitamin. If the primary condition can be cleared up, the Vincent's infection usually disappears as if by magic.

(3) The unknown cause of acute ulcerative stomatitis. This is a self-limiting disease. The causative agent is not known. It has been thought by some observers to be a virus - possibly the virus of herpes simplex. Because the infection is self-limiting, no specific treatment is necessary, and irrigations of hot saline or hot perborate solutions are the treatment of choice. It is well after the acute infection has subsided to advise careful cleaning of the teeth to avoid the setting up of a chronic infection in areas where the gums are not healthy.

In a patient with granulocytopenia no treatment will be effective against the fusospirochetosis. When a patient is recovering from a granulocytopenia, no omission of treatment will prevent the fusospirochetosis from clearing up.

The primary pathogenicity of Vincent's organism is doubtful and the contagious nature of the infection may be questioned. Therefore, extensive efforts at quarantine may be ill-advised, although sterilization of the dishes used by an active case of Vincent's infection is probably wise.

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The Use of Urea in the Treatment of Sulfonamide-Resistant Gonorrhea:

At a recent sectional meeting of the American Federation for Chemical Research, Schnitker and Lenhoff presented a preliminary report based on 33 cases who had failed to respond to one or more courses of sulfonamide. They were given urea 30 Gm. daily for 3 days, and then the sulfonamide was resumed. Twenty returned to duty, and there were 13 repeat failures. Six of the latter responded to continued intensive therapy, but in 7 the infection still persisted. These 7 were cured by penicillin. The rationale for the use of urea is that it is an "anti-inhibitor" of the sulfonamide "inhibitors." (E.L.L.)

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Acetyl-B-Methylcholine in Paroxysmal Tachycardia: Morgan discusses the management of the individual attack of paroxysmal tachycardia. He calls attention to the fact that this condition is a common functional cardiac abnormality usually seen in normal hearts and that, therefore, cases will be observed occasionally in our armed forces. Most attacks do not require medical attention, but it is estimated that 10 to 20 per cent defy the patient's efforts to stop them.

To prevent attacks direct therapy is usually not indicated, but attention is given to extracardiac somatic factors, and reassurance to the patient and investigation of psychic factors are indicated.

In the therapy of the individual attack carotid sinus reflex elicitation and sedatives should be tried. These should be followed by quinidine every two hours in doses sufficient to produce tinnitus. If quinidine be ineffective, digitalis may be useful either orally or parenterally.

In attacks resistant to the usual therapy, especially when the heart tones are becoming less vigorous and basal rales or very annoying systemic signs have appeared, mecholyl should be used and is usually very effective.

The patient receiving mecholyl should be recumbent. A bedpan should be ready as the patient may experience a sudden desire to defecate. The patient should be warned that he will probably experience a brilliant flush, perspiration, salivation and increased peristalsis. A sedative such as morphine should be given first. The average dose of mecholyl for adults is 20 to 50 mg. Atropine 1.2 mg. in solution should be ready in a syringe for intravenous use. A blood pressure cuff should be placed around the arm proximally to the site of intravenous injection. At the moment when the rhythm of the heart returns to normal, this can be inflated to prevent further absorption of mecholyl and to make ready a vein for the injection of atropine. The return to sinus rhythm has occurred as early as 80 seconds following mecholyl injection. If no effect on the rate is noted by the time the drug is at its peak effect, as manifested by flush in the blush areas, perspiration, salivation and loud peristalsis (2 to 10 minutes), massage of the site of injection and also carotid sinus stimulation should be tried. If no effect is manifest 30 minutes after the injection, another dose of mecholyl may be given. (Ann. Int. Med., Nov. '43.)

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Vitamin C Loss in Cooking and Preparation of Foods: The results of experiments recently conducted at the Naval Medical Research Institute have cast doubt on the accepted values for the ascorbic acid content of some of the foods commonly used as a source of this vitamin and have emphasized the magnitude of the losses of ascorbic acid which may occur in preparation and cooking.

A wide variation was found in the initial vitamin C content of foods. Standard food lists were often in error by as much as 75 per cent. For example, raw tomatoes varied in their ascorbic acid content from 4 to 21 mg. per 100 Gm. It had been previously shown that seasonal variations as to methods of storage played an important role in initial vitamin C content: summer-grown tomatoes often containing as much as 25 mg. per 100 c.c. and those purchased in April as little as 4 mg. per 100 c.c. For this reason it is probably wise in estimating the amount of vitamin C supplied by a food to use the lower or median value presented in a standard table in order to avoid the risk of overestimating the amount present.

Loss of ascorbic acid in cooking and processing may be as high as 95 per cent. In this loss important factors are the passage of the vitamin into cooking fluids and exposure of foods for long periods of time to air and to the oxidase systems present in foods. Of special interest is the action of metal as a catalyst in this oxidation. Metal squeezers for juices, metal knives and slicing machines introduce a catalytic agent which accelerates the oxidation of the vitamin especially in the presence of air. For example, orange juice produced by a metal squeezer and allowed to stand for an hour in contact with air lost 68 per cent of its ascorbic acid content in contrast to a loss of only 32 per cent when a glass squeezer was used. Cabbage processed with a metal machine slicer and exposed to air for an hour lost 78 per cent of its ascorbic acid content in contrast to a loss of 32 per cent when sliced with a plastic knife.

Different foods were found to vary in their susceptibility to vitamin C loss.

The investigators recommend the use of fresh or dehydrated foods which have high initial vitamin C content; the avoidance of maceration of vegetables and fruits by metal blades; and the reduction to a minimum of the time foods are exposed to air. They recommend also as much as possible the use of steam cooking and the introduction of the consumption of fresh fruit itself rather than the juice. (N.M.R.I. Project X-184; Pijoan and McCay, Nov. 12, '43.) (The report, complete with tables, is available to medical officers upon request to the N.M.R.I.)

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The Water-Pitressin Test in Epilepsy: The diagnosis of the convulsive state must be frequently made on the basis of history alone. In the differential diagnosis, malingering, syncope, hysteria, tetany and poisoning must be considered. It is, therefore, desirable that some test prove conclusively the validity of the history of periodic unconsciousness or convulsions.

Garland et al, in Lancet, November 6, 1943, review the subject and report on the usefulness of the Water-Pitressin test in 96 cases. The rationale of the procedure is based on the long-established relationship between fluid balance and the level of the convulsive threshold.

The technic is relatively simple and lends itself to field military use where there are neither electro-encephalographic facilities nor the opportunity for prolonged observation. It consists of simultaneously administering posterior pituitary extract and increasing the fluid intake by 3 to 5 liters.

Both "pitressin" and "puitritin" exert the desired antidiuretic action. In the work here reported the authors have used puitritin. The fluid consumption must be sufficient to insure a gain of from two to five per cent of body weight during the test period. It is also essential that salt intake be restricted for several days prior to the test. In practice, the test procedure is as follows:

- (1) Avoid anti-convulsive medication for at least 24 hours prior to the test.
- (2) Keep the patient in bed on a normal diet throughout the test and for 24 hours thereafter.
- (3) Give one pint of water hourly (usually a total of 11 pints is a sufficient quantity).
- (4) Starting with the fourth pint of water, give pituitrin hourly, the doses being 0.2, 0.3, 0.4, 0.5 c.c., followed by four doses of 0.5 c.c. - a total of eight injections should be the maximal number required.
- (5) Record blood pressure hourly and chart total fluid intake and output.
- (6) Stop the test once a convulsion has been induced and then give pheno-barbital 0.06 to 0.18 Gm., or dilantin 0.1 to 0.2 Gm. as anticonvulsants.

The associated effects are usually headache, gastro-intestinal disturbances (nausea, vomiting, diarrhea, abdominal cramps) and blood pressure fluctuation. Any one of these phenomena in a pronounced degree is a positive indication for immediate interruption of the test and the institution of appropriate counter-measures. In about 40 per cent of true epileptics, a positive diagnosis may be established. In the majority of reactions, the convulsive seizures are induced in from 12 to 15 hours after the onset of the test. (H.P.R.)

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Public Health Foreign Report:

<u>Disease</u>	<u>Place</u>	<u>Date</u>	<u>Number of Cases</u>
Dengue Fever	Honolulu, Hawaii Territory	Oct. 21, '43	662
Plague	Indochina, Cochinchina	Sept. 1-10, '43	5
		Sept. 11-20, '43	1
		Oct. 1-10, '43	1
	Peru, Libertad Dept.	Sept. '43	1 (1 death)
	Lima Dept.	Sept. '43	2
Smallpox	Basutoland, Africa	June '43	16
	Indochina	Sept. 1-10, '43	94
		Sept. 11-20, '43	108
		Oct. 1-10, '43	73
	Mauritania	Sept. 11-20, '43	13
		Oct. 1-10, '43	13
	Niger Territory	Oct. 1-10, '43	39
	Sudan (French)	Oct. 1-10, '43	46

Public Health Foreign Report(cont.):

<u>Disease</u>	<u>Place</u>		
Typhus Fever	Bulgaria	Sept. 9-15, '43	4
		Sept. 19-25, '43	10
	Hungary	Sept. 26-Oct. 2, '43	7
		Oct. 3-9, '43	12
	Iran	Aug. 8-14, '43	57 (9 deaths)
	Palestine	Oct. 3-9, '43	15
	Rumania	Oct. 3-9, '43	30
		Oct. 10-16, '43	28
		Oct. 17-23, '43	37
	Slovakia	Sept. 19-25, '43	11
		Sept. 26-Oct. 2, '43	27
		Oct. 3-9, '43	27
	Spain	Aug. 8-14, '43	2
		Aug. 15-28, '43	12
	Union of South Africa	June '43	292
Yellow Fever	Dahomey, Djougou District	Sept. 3, '43	2
	Gold Coast, Asuboi	Sept. 12, '43	1 (1 death)

(Pub. Health Reps., Nov. 5 & 12, '43.)

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Tourniquets: At a meeting of the War Wounds Committee of the British National Research Council it was pointed out by the various members of the Committee that tourniquets were dangerous in the hands of all personnel and that it was the opinion of the assembled group that seldom does a tourniquet save a life. The disadvantages of the tourniquet were enumerated as follows: The tourniquet is often applied only tight enough to stop the return of venous flow and therefore may increase arterial hemorrhage. Associated with the use of the tourniquet there is also a vascular reaction which is highly undesirable as well as marked danger of ischemic contractions and gangrene.

The Committee recommended that a pressure bandage be applied directly to the wound and an attempt be made to control the hemorrhage in this way. The majority of the surgeons present wished to pass a motion that tourniquets should be eliminated altogether from all first-aid kits. It was believed that this would be rather dangerous to morale since individuals had been taught and expected to use a tourniquet in case of severe hemorrhage. However, it was their opinion that the tourniquet should not be used except in most extreme cases and that the pressure bandage should be applied over the bleeding wound. (J.H.K.)

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BUREAU OF MEDICINE AND SURGERY.

BUMED-C-LET
L8-2(072)

29 Nov 1943

To: All Ships and Stations.

Subj: Medical Stores, modification of control, issue, and invoicing procedures.

Ref: (a) Appendix D, MMD, Cir Ltr F, 5-26-41.
(b) Alnav of 29 Nov 1943.

1. A modification in the procedures for controlling, issuing and invoicing medical stores at all NavMedSupDeps and at NavMedSup Storehouses within continental United States has been established, effective 1 January 1944. No change is effected in established procedure at overseas numbered NavMedSup Storehouses.

2. The effect of the modification is summarized as follows:

(a) The original (ribbon) copy of NavMed Form 4, Medical Stores Requisition, only, is required to be forwarded by the activity requesting medical stores. One copy shall be retained.

(b) All NavMed Form 4 requisitions for medical stores shall be submitted to BuMed (Materiel Division), Sands and Pearl Sts., Brooklyn 1, N.Y., except when immediate issue from the nearest NavMedSupDep or Storehouse is necessary, in which case NavMed Form 4, or despatch, shall be submitted directly to the nearest issuing depot or storehouse.

(c) Until the revised NavMed Form 4 is distributed, the present form shall be modified by changing the "minimum stock" column heading to read "on order", and entering therein, opposite respective items, the quantities requested on previous requisitions but not received. The allotment data may be omitted.

(d) Medical Stores in all NavMedSupDeps and Storehouses located in the United States will be controlled, accounted for, and invoiced to receiving activities by BuMed, (Materiel Division), Sands and Pearl Sts., Brooklyn 1, N.Y.

(e) A limited quantity of commonly used items will be maintained at each NavMedSupDep, and at NavMedSup Storehouses in the United States, as an "immediate issue stock", within the limits of which urgent issues can be made when

necessary, and later invoiced in the usual manner. Requests made to issuing depots and storehouses for immediate issues shall be limited to the items and quantities sufficient to meet urgent needs until replenishment can be obtained by routine procedures.

(f) NavMedSupDeps and Storehouses are authorized to make urgent issues within the limits of the commissioning outfit lists and their respective "Immediate Issue Stock" quantities, upon presentation of adequate justification by the requesting activity. Other immediate issue requests shall be submitted to BuMed, (Materiel Division), Sands and Pearl Sts., Brooklyn 1, N.Y., by air mail or despatch as indicated.

(g) Upon receipt of NavMed Form 4 requisitions at BuMed (Materiel Division), Brooklyn, sufficient copies will be mechanically produced showing original request, modifications made, unit, price, class totals, and totals, for all purposes. Issues will be made from the nearest NavMedSupDep or storehouse to the requesting activity, and completed copies of the invoice showing all necessary data, will be furnished all interested activities. Issues may be made from more than one depot or storehouse on a single requisition.

(h) Separate requisitions shall be prepared for:

- (1) Supply Catalog Items.
- (2) Non-listed items.

3. Reference (a) will be revised and distributed at an early date.

D. G. SUTTON
Rear Admiral (MC), USN
Acting Chief of Bureau

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BUREAU OF MEDICINE AND SURGERY

BUMED-Y-HS
A9-1/P2-4(113)

25 Nov 1943

To: All Ships and Stations.

Subj: Historical Data, Inclusion of in Annual Sanitary Report.

1. In conformity with the directive of the President stressing the importance of "Preserving for those who come after us an accurate and objective account of our present experience," governmental agencies have intensified their efforts to compile and preserve historical records. The Bureau will attempt the preparation of a narrative account of Medical Department activities during the present War.

2. It is requested, therefore, that data of historical interest be included in the Annual Sanitary Report under the heading "Historical Data." The historical data should be conceived of as an annual narrative report. With variations according to type and activity of ship or station, the historical data should be summarized under the following headings: (a) general, (b) administration, (c) summary of events (with indication of part played by the medical establishment), (d) battle and crises experiences, (e) clinical and professional notes (including data relative to (1) preventive medicine, (2) clinical practices, (3) employment of and results from new and improved techniques or drugs, (4) noteworthy cases, (5) suggestions for research). Furthermore, observations believed to have "personal interest" should be included.

3. The above instructions shall be complied with in the preparation of the Annual Sanitary Report for the calendar year 1943.

D. G. SUTTON
Rear Admiral (MC), USN
Acting Chief of Bureau

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BUREAU OF NAVAL PERSONNEL

P-411-GP
BuMed-X-JRC-I
P2/5-P3-1(103-40)

18 November 1943

To: All Ships and Stations.
Attn: Medical Officer, Selection and/or Personnel Officer.

Subj: Navy Radium Plaque Adaptometer--Directions for Use of Test and Test Results in Selecting Men for Night Lookout Training or Duty.

Refs: (a) VCNO ltr. Op-23-1-BH(SC)P2-3, serial O287923, of 14 July 1943.

Refs: (b) Instructions for Administering the Night Vision Test With the Navy Radium Plaque Adaptometer.
 (c) Instructions for Operation and Maintenance of Navy Radium Plaque Adaptometer.

1. Ref. (a) and amendments thereto directed the Bureaus of Medicine and Surgery and Naval Personnel to procure and distribute an "Adaptometer for Night Vision Testing" and to establish adequate procedures for administering this test and for interpreting test results.

2. In compliance with ref. (a), the Bureau of Medicine and Surgery has developed the "Navy Radium Plaque Adaptometer" now in production. It will be delivered, together with copies of refs. (b) and (c), to units of the fleet and to night lookout training schools.

3. The Bureau of Medicine and Surgery directs properly instructed medical personnel to administer this test according to instructions contained in ref. (b). Entry of test results must be made in health record of each officer and man. It recommends that test results be considered in selecting men and officers for night lookout training and duty. Test results will be given in terms of the following categories: Rejected, Fair, and Good.

4. The Bureau of Medicine and Surgery directs that medical personnel shall carefully operate and maintain the "Navy Radium Plaque Adaptometer" in order that it may constantly serve as a standard test; see ref. (c).

5. The Bureau of Naval Personnel directs selection and/or personnel officers to consider these test results in selecting officers and men for night lookout training and duty. No person whose score is "Rejected" should be assigned to night lookout training or duty or any other duty involving night vision on which the safety of others depends. Personnel who receive scores of "Fair" or "Good" may be so assigned. In interpreting the scores "Fair" and "Good" it is necessary to keep in mind the following fact: The adaptometer is a test of retinal sensitivity in the dark and is not a test of lookout ability. Ability to see does not necessarily imply ability to recognize. Good lookouts must be selected and trained carefully. Selection from among personnel who scored "Fair" or "Good" on the adaptometer test should be based on the man's general intelligence, attitude toward Navy duties, alertness, and interest in this duty. Further studies of selection factors are in progress and findings will be reported to all addressed activities as soon as available.

6. Director of training in each naval district maintains current list of lookout trainer locations and availability thereof.

--BuPers. L. E. Denfeld.

--BuMed. D. G. Sutton.